What is claimed is:

1 A voice detecting method of discriminating a voice section from a non-voice section for every fixed time length for a voice signal, using feature quantity calculated from said voice signal input for every fixed time length, characterized in that the voice section is discriminated from the non-voice section for every fixed time length in the voice signal, using a long-time average of change quantities obtained by inputting change quantities of the feature quantity to filters.

2 A voice detecting method recited in claim 1, wherein the change quantities of said feature quantity are calculated by using said feature quantity and a long-time average thereof.

3 A voice detecting method recited in claim 1, wherein said filters are switched to each other when the long-time average of said change quantities is calculated, using a result of discrimination output in the past.

4 A voice detecting method recited in claim 1, wherein the feature quantity calculated from the voice signal input in the past is used.

5 A voice detecting method recited in claim 1, wherein at least one of a line spectral frequency, a whole band energy, a low band energy and a zero cross number is used for said feature quantity.

6 A voice detecting method recited in claim 5, wherein at least one of a line spectral frequency that is calculated from a linear predictive coefficient decoded by means of a voice decoding method, a whole band energy, a low band energy and a zero cross number that are calculated from a regenerative voice signal output in the past by means of said voice decoding method are used.

7 A voice detecting apparatus for discriminating a voice section from a non-voice section for every fixed time length for a voice signal, using feature quantity calculated from said voice signal input for every fixed time length, said apparatus comprises:

an LSF calculating circuit for calculating a line spectral frequency (LSF) from the voice signal;

a whole band energy calculating circuit for calculating a whole band energy from said voice signal;

a low band energy calculating circuit for calculating a low band energy from said voice signal;

a zero cross number calculating circuit for calculating a zero cross number from said voice signal;

a line spectral frequency change quantity calculating section for calculating change quantities (first change quantities) of said line spectral frequency; a whole band energy change quantity calculating section for calculating change quantities (second change quantities) of said whole band energy; a low band energy change quantity calculating section for calculating change quantities (third change quantities) of said low band energy;

a zero cross number change quantity calculating section for calculating change quantities (fourth change quantities) of said zero cross number;

a first filter for calculating a long-time average of said first change quantities;

a second filter for calculating a long-time average of said second change quantities;

a third filter for calculating a long-time average of said third change quantities; and

a fourth filter for calculating a long-time average of said fourth change quantities.

8 A voice detecting apparatus recited in claim 7, wherein said apparatus further comprises:

a first storage circuit for holding a result of said

discrimination, which was output in the past from the voice detecting apparatus;

a first switch for switching a fifth filter to a sixth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said first change quantities is calculated;

a second switch for switching a seventh filter to an eighth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said second change quantities is calculated;

a third switch for switching a ninth filter to a tenth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said third change quantities is calculated; and

a fourth switch for switching an eleventh filter to a twelfth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said fourth change quantities is calculated.

9 A voice detecting apparatus recited in claim 7, wherein said line spectral frequency, said whole band energy, said low band energy and said zero cross number are calculated from said voice signal input in the past.

10 A voice detecting apparatus recited in claim 7, wherein at least one of the line spectral frequency, the whole band energy, the low band energy and the zero cross number is used for said feature quantity.

11 A voice detecting apparatus recited in claim 7, wherein said apparatus further comprises a second storage circuit for storing and holding a regenerative voice signal output from a voice decoding device in the past, and

uses at least one of a whole band energy, a low band energy and a zero cross number that are calculated from said regenerative voice signal output from said second storage circuit, and a line spectral frequency that is calculated from a linear predictive coefficient decoded in said voice decoding device.

12 A voice detecting apparatus for discriminating a voice section from a non-voice section for every fixed time length for a voice signal, using feature quantity calculated from said voice signal input for every fixed time length, said apparatus comprises:

an LSF calculating circuit for calculating a line spectral frequency (LSF) from the voice signal;

a whole band energy calculating circuit for calculating a whole band energy from said voice signal;

a low band energy calculating circuit for calculating a low band energy from said voice signal;

a zero cross number calculating circuit for calculating a zero cross number from said voice signal;

a first change quantity calculating section for calculating first change quantities based on a difference between said line spectral frequency and a long-time average thereof;

a second change quantity calculating section for calculating second change quantities based on a difference between said whole band energy and a long-time average thereof;

a third change quantity calculating section for calculating third change quantities based on a difference between said low band energy and a long-time average thereof;

a fourth change quantity calculating section for calculating fourth change quantities based on a difference between said zero cross number and a long-time average thereof;

a first filter for calculating a long-time average of said first change quantities;

a second filter for calculating a long-time average of

said second change quantities;

a third filter for calculating a long-time average of said third change quantities; and

a fourth filter for calculating a long-time average of said fourth change quantities.

13 A voice detecting apparatus recited in claim 12, wherein said apparatus further comprises:

a first storage circuit for holding a result of said discrimination, which was output in the past from the voice detecting apparatus;

a first switch for switching a fifth filter to a sixth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said first change quantities is calculated;

a second switch for switching a seventh filter to an eighth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said second change quantities is calculated;

a third switch for switching a ninth filter to a tenth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said third change quantities is calculated; and

a fourth switch for switching an eleventh filter to a

twelfth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said fourth change quantities is calculated.

14 A voice detecting apparatus recited in claim 12, wherein said line spectral frequency, said whole band energy, said low band energy and said zero cross number are calculated from said voice signal input in the past.

15 A voice detecting apparatus recited in claim 12, wherein at least one of the line spectral frequency, the whole band energy, the low band energy and the zero cross number is used for said feature quantity.

16 A voice detecting apparatus recited in claim 12, wherein said apparatus further comprises a second storage circuit for storing and holding a regenerative voice signal output from a voice decoding device in the past, and

uses at least one of a whole band energy, a low band energy and a zero cross number that are calculated from said regenerative voice signal output from said second storage circuit, and a line spectral frequency that is calculated from a linear predictive coefficient decoded in

said voice decoding device.

17 A recording medium readable by an information processing device constituting a voice detecting apparatus for discriminating a voice section from a non-voice section for every fixed time length for a voice signal, using feature quantity calculated from said voice signal input for every fixed time length, in which a program is recorded for making said information processing device execute processes (a) to (l):

(a) a process of calculating a line spectral frequency (LSF) from said voice signal;

(b) a process of calculating a whole band energy from said voice signal;

(c) a process of calculating a low band energy from said voice signal;

(d) a process of calculating a zero cross number from said voice signal;

(e) a process of calculating change quantities (first change quantities) of said line spectral frequency;

(f) a process of calculating change quantities (second change quantities) of said whole band energy;

(g) a process of calculating change quantities (third change quantities) of said low band energy;

(h) a process of calculating change quantities (fourth

change quantities) of said zero cross number;

(I) a process of calculating a long-time average of said first change quantities;

(j) a process of calculating a long-time average of said second change quantities;

(k) a process of calculating a long-time average of said third change quantities; and

(l) a process of calculating a long-time average of said fourth change quantities.

18 A recording medium recited in claim 17, which is readable by said information processing device, in which a program is recorded for making said information processing device execute processes (a) to (e):

(a) a process of holding a result of said discrimination, which was output in the past;

(b) a process of switching a fifth filter to a sixth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said first change quantities is calculated;

(c) a process of switching a seventh filter to an eighth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said second change quantities is calculated;

(d) a process of switching a ninth filter to a tenth

filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said third change quantities is calculated; and

(e) a process of switching an eleventh filter to a twelfth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said fourth change quantities is calculated.

19 A recording medium recited in claim 17, which is readable by said information processing device, in which a program is recorded for making said information processing device execute a process of calculating said line spectral frequency, said whole band energy, said low band energy and said zero cross number as said feature quantity from said voice signal input in the past.

20 A recording medium recited in 17, which is readable by said information processing device, in which a program is recorded for making said information processing device execute at least one of processes (a) to (d):

(a) a process of calculating a line spectral frequency (LSF) from said voice signal;

(b) a process of calculating a whole band energy from said voice signal;

(c) a process of calculating a low band energy from said voice signal; and

(d) a process of calculating a zero cross number from said voice signal.

21 A recording medium recited in claim 17, which is readable by said information processing device, in which a program is recorded for making said information processing device execute:

(a) a process of storing and holding a regenerative voice signal output from a voice decoding device in the past, and at least one of processes (b) to (e):

(b) a process of calculating a line spectral frequency (LSF) from said regenerative voice signal;

(c) a process of calculating a whole band energy from said regenerative voice signal;

(d) a process of calculating a low band energy from said regenerative voice signal; and

(e) a process of calculating a zero cross number from said regenerative voice signal.

22 A recording medium readable by an information processing device constituting a voice detecting apparatus for discriminating a voice section from a non-voice section for every fixed time length for a voice signal,

using feature quantity calculated from said voice signal input for every fixed time length, in which a program is recorded for making said information processing device execute processes (a) to (l):

(a) a process of calculating a line spectral frequency (LSF) from said voice signal;

(b) a process of calculating a whole band energy from said voice signal;

(c) a process of calculating a low band energy from said voice signal;

(d) a process of calculating a zero cross number from said voice signal;

(e) a process of calculating first change quantities based on a difference between said line spectral frequency and a long-time average thereof;

(f) a process of calculating second change quantities based on a difference between said whole band energy and a long-time average thereof;

(g) a process of calculating third change quantities based on a difference between said low band energy and a long-time average thereof;

(h) a process of calculating fourth change quantities based on a difference between said zero cross number and a long-time average thereof;

(I) a process of calculating a long-time average of said

first change quantities;

(j) a process of calculating a long-time average of said second change quantities;

(k) a process of calculating a long-time average of said third change quantities; and

(l) a process of calculating a long-time average of said fourth change quantities.

23 A recording medium recited in claim 22, which is readable by said information processing device, in which a program is recorded for making said information processing device execute processes (a) to (e):

(a) a process of holding a result of said discrimination, which was output in the past;

(b) a process of switching a fifth filter to a sixth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said first change quantities is calculated;

(c) a process of switching a seventh filter to an eighth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said second change quantities is calculated;

(d) a process of switching a ninth filter to a tenth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time

average of said third change quantities is calculated; and

(e) a process of switching an eleventh filter to a twelfth filter using the result of said discrimination, which is input from said first storage circuit, when the long-time average of said fourth change quantities is calculated.

24 A recording medium recited in any of claim 22, which is readable by said information processing device, in which a program is recorded for making said information processing device execute a process of calculating said line spectral frequency, said whole band energy, said low band energy and said zero cross number as said feature quantity from said voice signal input in the past.

25 A recording medium recited in any of claim 22, which is readable by said information processing device, in which a program is recorded for making said information processing device execute at least one of processes (a) to (d):

(a) a process of calculating a line spectral frequency (LSF) from said voice signal;

(b) a process of calculating a whole band energy from said voice signal;

(c) a process of calculating a low band energy from said

voice signal; and

(d) a process of calculating a zero cross number from said voice signal.

26 A recording medium recited in claim 22, which is readable by said information processing device, in which a program is recorded for making said information processing device execute (a) a process of storing and holding a regenerative voice signal output from a voice decoding device in the past, and at least one of processes (b) to (e):

(b) a process of calculating a line spectral frequency (LSF) from said regenerative voice signal;

(c) a process of calculating a whole band energy from said regenerative voice signal;

(d) a process of calculating a low band energy from said regenerative voice signal; and

(e) a process of calculating a zero cross number from said regenerative voice signal.